

WHAT IS CLAIMED IS:

1. A p-type nitride semiconductor structure having an indium-containing p-type nitride semiconductor layer regrown on a p-type nitride semiconductor processed by etching.  
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2. The p-type nitride semiconductor structure according to claim 1, wherein said indium-containing p-type nitride semiconductor layer is p-type InGaN.  
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3. A p-type nitride semiconductor structure comprising on a substrate:
  - an n-type collector layer;
  - 15 a p-type base layer formed on said n-type collector layer; and
  - an n-type emitter layer formed on said p-type base layer, wherein
  - a surface of said p-type base layer, which is  
20 exposed by etching said n-type emitter layer, is provided with an indium-containing p-type nitride semiconductor layer, which is regrown on said surface.
4. The p-type nitride semiconductor structure according to claim 3, wherein said p-type nitride semiconductor layer is p-type InGaN.  
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5. The p-type nitride semiconductor structure according to any of claims 1-4, wherein said p-type base layer is p-type InGaN.
- 5     6. The p-type nitride semiconductor structure according to any of claims 1-5, wherein said p-type InGaN base layer has an indium mole fraction of 5 - 30%.
- 10     7. The p-type nitride semiconductor structure according to any of claims 1-6, wherein said p-type nitride semiconductor layer has an indium mole fraction higher than an indium mole fraction of said p-type InGaN base layer.
- 15     8. A p-type nitride semiconductor bipolar transistor having on a substrate, an n-type collector layer, a p-type base layer formed on the n-type collector layer, and an n-type emitter layer formed on said
- 20     p-type base layer, said p-type base layer being a p-type nitride semiconductor, said bipolar transistor comprising:
- an indium-containing p-type nitride semiconductor layer, which is regrown on a surface of said p-type
- 25     base layer, which surface is exposed by etching said n-type emitter layer.

9. The p-type nitride semiconductor bipolar transistor according to claim 8, wherein said p-type nitride semiconductor layer is p-type InGaN.
- 5 10. The p-type nitride semiconductor bipolar transistor according to claims 8 or 9, wherein said p-type base layer is p-type InGaN.
- 10 11. The p-type nitride semiconductor bipolar transistor according to claims 8, 9 or 10, further comprising a graded layer between said p-type base layer and said n-type collector layer, said graded layer has its indium mole fraction varied gradually.
- 15 12. The p-type nitride semiconductor bipolar transistor according to any of claims 8-11, wherein said p-type InGaN base layer has an indium mole fraction of 5 - 30%.
- 20 13. The p-type nitride semiconductor bipolar transistor according to any of claims 8-12, wherein said p-type nitride semiconductor layer has an indium mole fraction higher than the indium mole fraction of said p-type InGaN base layer.